The King County Department of Transportation (DOT) conducted a culvert survey of the Snoqualmie River mainstem and tributaries that drain directly to the mainstem and are not located in another subwatershed. DOT identified 41 culverts that do not meet the standards for fish passage established by the Washington Department of Fish and Wildlife and therefore are considered to be fish passage barriers (Fritz, 2001). Based on this data, the Snoqualmie River mainstem was rated as "degraded" for instream artificial barriers to habitat in the *Salmonid Species Habitat Conditions Review* (Snohomish Basin Salmonid Recovery Technical Committee, 2002).

Channel Modifications

Figures 20 and 21 show the locations of channel modifications including barbs, bridge footings, flow deflectors, docks, wooden pilings, utility crossings, and weirs. Barbs are riprap features that are designed to deflect flow away from a bank. Pilings are the remains of old docks that were used in historic boat transportation on the Snoqualmie River. By nailing boards parallel to the river flow, these pilings also function like bank armoring. Barbs and pilings were the most frequently noted structures. Thirty-six barbs were mapped; they were evenly distributed throughout the study area. Forty-six areas of pilings were observed, with the largest concentrations occurring between RM 11-19 and RM 29-38. Docks were observed only at RM 7.5; human access by foot and boat are also indicated at this location (Figure 20).

Riparian Vegetation

Figures 22 to 25 show the location, types, and density of riparian shrubs and riparian trees that were growing on the banks of the Snoqualmie River downstream of Snoqualmie Falls in the summer of 2000 and could be seen from the boats during the habitat conditions inventory. The designation of "non-dense" indicates low or moderate density of the vegetation. The designation of "non-dense" indicates low or moderate density of the vegetation. Several shrub species that are not native to the Pacific Northwest were observed throughout the length of the survey. Of these, Himalayan blackberry (*Rubus discolor*), Japanese knotweed (*Polygonum cuspidatum*), and virgin's bauer (*Clematis spp.*) were prolific. Other invasive species included English ivy (*Hedera spp.*), butterfly bush (*Buddleia davidii*), and yellow tansy (*Tanacetum vulgare*), which is poisonous to livestock if ingested. Purple loosestrife (*Lythrum salicaria*), a very aggressive, nonnative species, was observed in a few locations in the reach between the Tolt River Bridge and Neal Road (RM 24-33). Purple loosestrife is listed as a Class B weed; this means that it is abundant in some areas of Washington State, and controlling the spread of this species is required by law (King County WLRD, 2002a).

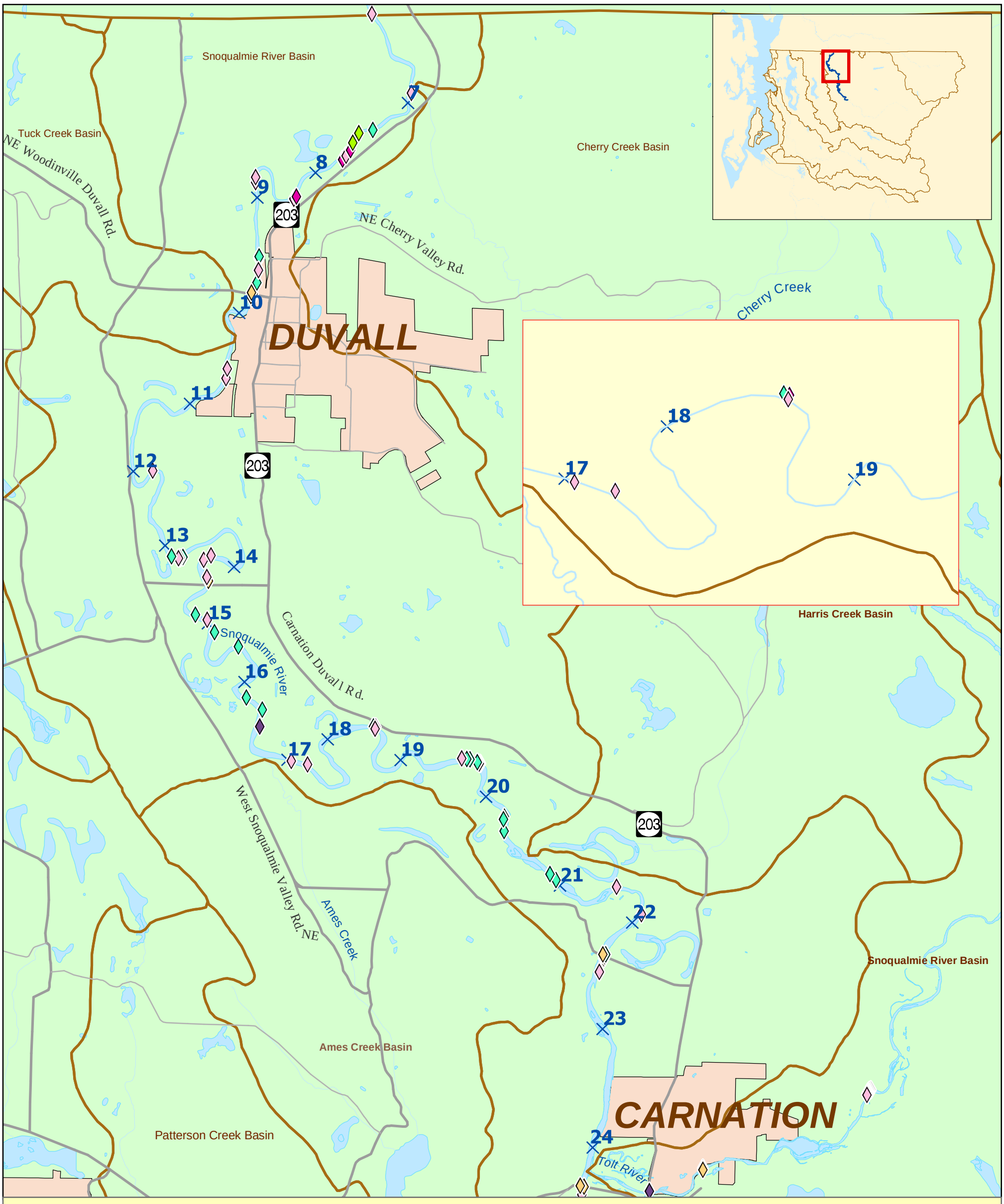
Native shrub species that were present included willow, snowberry (*Symphoricarpos albus*), salmonberry (*Rubus spectabilis*), red osier dogwood (*Cornus stolonifera),* Oregon grape (*Berberis nervosa*), elderberry (*Sambucus spp.),* and Indian plum (*Oemleria cerasiformis*). Bracken ferns (*Pteridium aquilinum*), sword ferns (*Polystichum munitum*), and lady ferns (*Athyrium filix-femina*) were also present. Stands of native riparian vegetation were typically composed of several species whereas stands of nonnative shrubs were usually monocultures.

Most of the riparian trees were deciduous, with red alder, vine maple, and black cottonwood found most frequently. Only three areas had more than 30% conifers, i.e., RM 22.4-22.5 on the LB, 36.3-36.5 on the LB, and RM 36.4-36.7 on the RB. Conifers were 5% to 30% of the trees at the following locations: RM 11.5-11.7 on the RB, 18.4-18.6 on the RB, 20.8-21.2 on the LB, 22.5-22.9 on the LB, 24.9-25 on the LB, 26.2-26.3 on the RB, 33.9-34 on the RB, 35.7-36.2 on the RB, 36.4-36.5 on the RB, and 36.7-38 on both banks. Coniferous species included western redcedar, Sitka spruce, grand fir (*Abies spp.*), and western hemlock (*Tsuga heterophylla*).

Figure 20.

SNOQUALMIE RIVER SURVEY: Channel Modifications

Map 1 of 2



21 River Miles
Minor Roads
Major Roads
DNRP Basin Boundary
Incorporated Areas

BARB
BRIDGE FOOTING
DEFLECTOR
DOCK
OTHER
PILING
UTILITY CROSSING
WEIR

0 0.5 1 2 3 4 Miles

King County
Department of Natural Resources and Parks
Water and Land Resources Division

DATA SOURCE NOTES:
Erosional Features: KC DNRP & Washington Trout survey, 2000
Waterbodies: KC DNRP & WA DOE Hydrography Project, 1997
River Miles: Generated from waterbody routes in waterbody layer
Basin Boundaries: KC DNRP Basin Planning, 1997

PRODUCED BY:
Department of Natural Resources & Parks
GIS unit
CJG & CAC, July 2002
\\Wlrnt6\work\02037

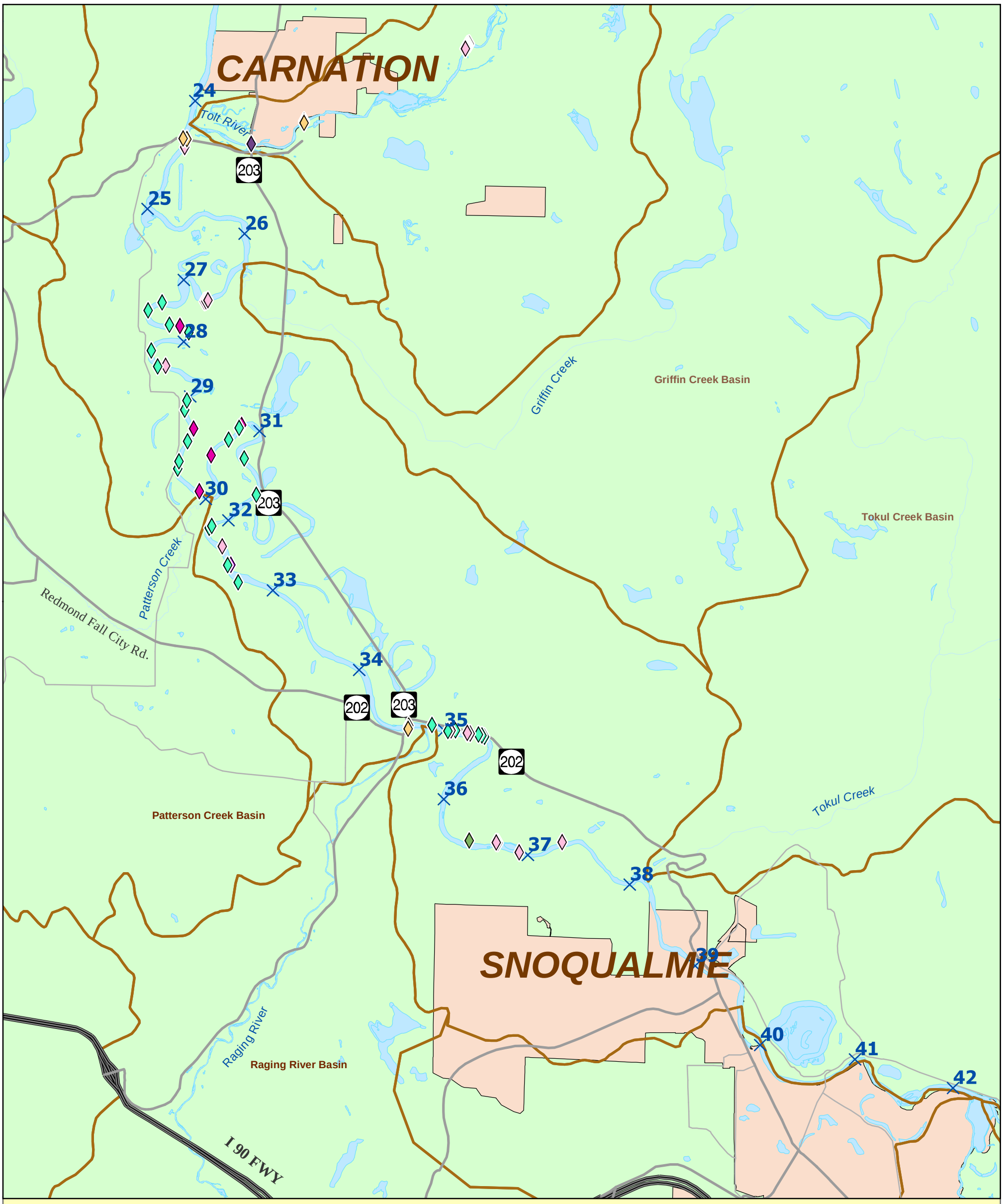


Figure 21.

SNOQUALMIE RIVER SURVEY: Channel Modifications

Map 2 of 2

N

21 River Miles
Minor Roads
Major Roads
DNRP Basin Boundary
Incorporated Areas

BARB
BRIDGE FOOTING
DEFLECTOR
DOCK
OTHER
PILING
UTILITY CROSSING
WEIR

0 0.5 1 2 3 4 Miles

King County
Department of Natural Resources and Parks
Water and Land Resources Division

DATA SOURCE NOTES:
Erosional Features: KC DNRP & Washington Trout survey, 2000
Waterbodies: KC DNRP & WA DOE Hydrography Project, 1997
River Miles: Generated from waterbody routes in waterbody layer
Basin Boundaries: KC DNRP Basin Planning, 1997

PRODUCED BY:
Department of Natural Resources & Parks
GIS unit
CJG & CAC, July 2002
\\Wlrnt6\work\02037

Snoqualmie River Basin
Cherry Creek Basin
NE Woodinville Duvall Rd.
NE Cherry Valley Rd.
Cherry Creek
DUVALL
203
Harris Creek
Harris Creek Basin
Carnation Duvall Rd.
Snoqualmie River
West Snoqualmie Valley Rd. NE
Ames Creek
Ames Creek Basin
Patterson Creek Basin
Snoqualmie River Basin
CARNATION
Tolt River
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Figure 22.

SNOQUALMIE RIVER SURVEY: Riparian Vegetation - Shrubs

Map 1 of 2

N

21 River Miles
Minor Roads
Major Roads
DNRP Basin Boundary
Incorporated Areas

All Non-Native or Non-Native Dominant
NON-DENSE
DENSE

All Native or Native Dominant
NON-DENSE
DENSE

0 0.5 1 2 3 4 Miles

King County
Department of Natural Resources and Parks
Water and Land Resources Division

DATA SOURCE NOTES:
Large Woody Debris: KC DNRP & Washington Trout survey, 2000
Waterbodies: KC DNRP & WA DOE Hydrography Project, 1997
River Miles: Generated from waterbody routes in waterbody layer
Basin Boundaries: KC DNRP Basin Planning, 1997

PRODUCED BY:
Department of Natural Resources & Parks
GIS unit
CJG & CAC, July 2002
\\Wlrnt6\work\02037

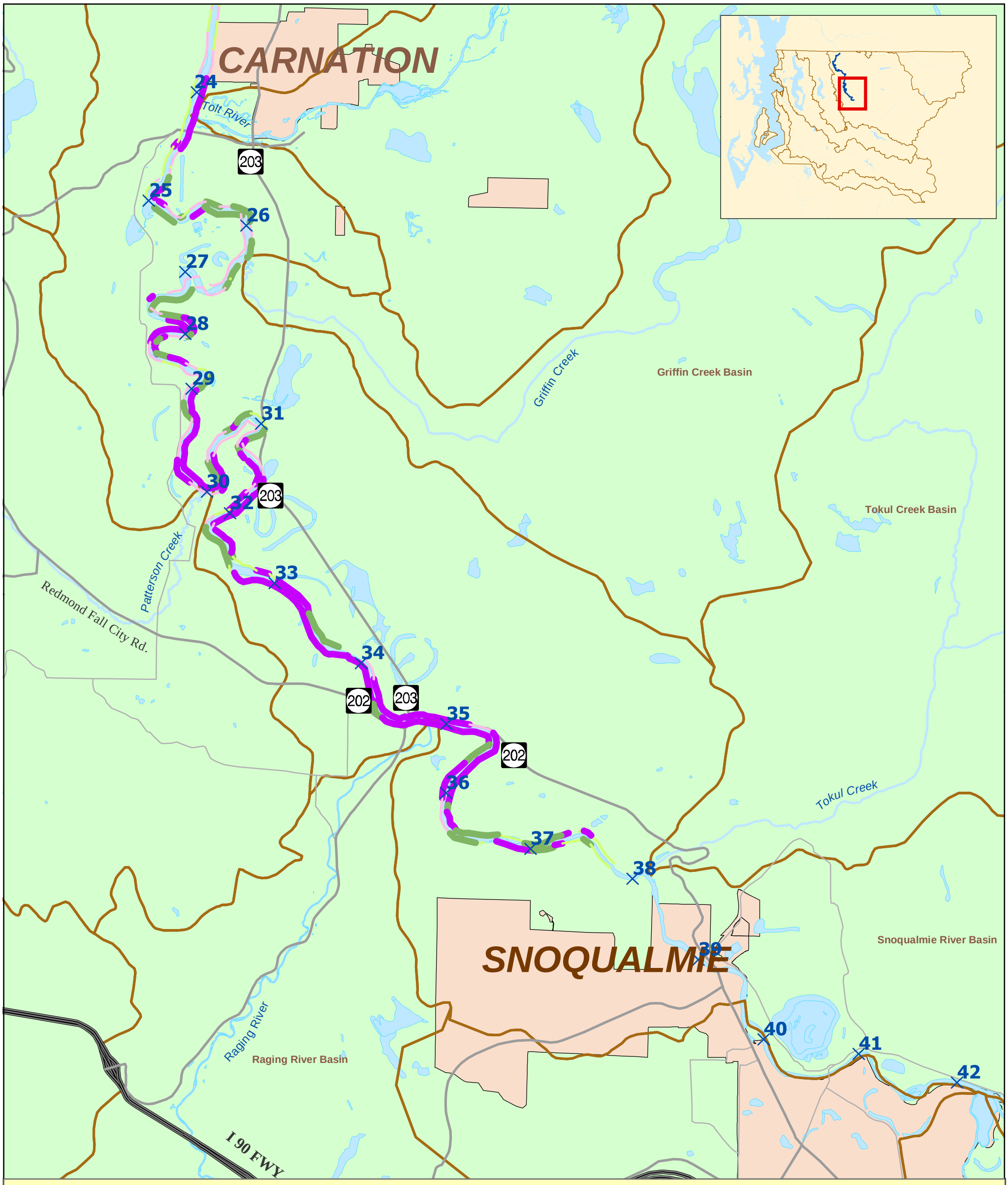


Figure 23.

SNOQUALMIE RIVER SURVEY: Riparian Vegetation - Shrubs

Map 2 of 2

N

21 River Miles
Minor Roads
Major Roads
DNRP Basin Boundary
Incorporated Areas

All Non-Native or Non-Native Dominant
NON-DENSE
DENSE

All Native or Native Dominant
NON-DENSE
DENSE

0 0.5 1 2 3 4 Miles

King County
Department of Natural Resources and Parks
Water and Land Resources Division

DATA SOURCE NOTES:
Large Woody Debris: KC DNRP & Washington Trout survey, 2000
Waterbodies: KC DNRP & WA DOE Hydrography Project, 1997
River Miles: Generated from waterbody routes in waterbody layer
Basin Boundaries: KC DNRP Basin Planning, 1997

PRODUCED BY:
Department of Natural Resources & Parks
GIS unit
CJG & CAC, July 2002
\\Wlrnt6\work\02037